Splice. The mechanical joining of one or more severed conductors in a single length of a cable including the replacement of insulation and jacket.

Splice Kit. A group of materials and related instructions which clearly identify all components and detail procedures used in safely making a flame-resistant splice in an electric cable.

§ 7.403 Application requirements.

(a) *Electric cables and signaling cables*. A single application may address two or more sizes, types, and constructions if the products do not differ in composition of materials or basic design. Applications shall include the following information for each product:

(1) Product information:

(i) Cable type (for example, G or G-GC).

(ii) Construction (for example, round or flat).

(iii) Number and size (gauge) of each conductor.

(iv) Voltage rating for all cables containing electric conductors.

(v) For electric cables, current-carrying capacity of each conductor, with corresponding ambient temperature upon which the current rating (ampacity) is based, of each power conductor.

(2) Design standard. Specify any published consensus standard used and fully describe any deviations from it, or fully describe any nonstandard design used.

(3) Materials. Type and identifying numbers for each material comprising the finished assembly.

(b) *Splice kit*. A single application may address two or more sizes, types, and constructions if the products do not differ in composition of materials or basic design. Applications shall include the following information for each product:

(1) Product information:

(i) Trade name or designation (for example, style or code number).

(ii) Type or kit (for example, shielded or nonshielded).

(iii) Voltage rating.

(2) Design standard. Specify any published design standard used and fully describe any deviations from it, or provide complete final assembly dimensions for all components for each cable that the splice kit is designed to repair.

(3) Materials. Type of materials, supplier, supplier's stock number or designation for each component.

(4) Complete splice assembly instructions which clearly identify all components and detail procedures used in making the splice.

§ 7.404 Technical requirements.

(a) Electric cables and splices shall be flame resistant when tested in accordance with § 7.407.

(b) Signaling cables shall be flame resistant when tested in accordance with § 7.408.

§ 7.405 Critical characteristics.

(a) A sample from each production run, batch, or lot of manufactured electric cable, signaling cable, or splice made from a splice kit shall be flame tested, or

(b) A sample of the materials that contribute to the flame-resistant characteristic of the cable or splice and a sample of the cable or splice kit assembly shall be visually inspected or tested through other means for each production run, batch, or lot to ensure that the finished product meets the flame-resistance test.

§ 7.406 Flame test apparatus.

The principal parts of the apparatus used to test for flame resistance of electric cables, signaling cables and splices shall include#:

(a) *Test chamber*. A rectangular enclosure measuring 17 inches deep by 14½ inches high by 39 inches wide and completely open at the top and front. The floor or base of the chamber shall be fabricated or lined with a noncombustible material that will not extinguish burning matter which may fall from the test specimen during testing. The chamber shall have permanent connections mounted to the back wall, sides, or floor of the chamber which extend to the sample end location. These are used to energize the electric cable and splice specimens. They are not used, but may stay in place, when testing signaling cables.

(b) *Specimen holder (support)*. A specimen holder (support) consisting of

three separate metal rods each measuring approximately 3⁄16 inch in diameter (nominal) to support the specimen. The horizontal portion of the rod which contacts the test specimen shall be approximately 12 inches in length.

(c) *Gas ignition source.* A standard natural gas type Tirrill burner, with a nominal inside diameter of 3⁄8 inch, to apply the flame to the test specimen. The fuel for the burner shall be natural gas composed of at least 96 percent combustible hydrocarbons, with at least 80 percent being methane.

(d) *Current source.* (For electric cables and splices only). A source of electric current (either alternating current or direct current) for heating the power conductors of the test specimen. The current source shall have a means to regulate current flow through the test specimen and have an open circuit voltage not exceeding the voltage rating of the test specimen.

(e) *Current measuring device.* (For electric cables and splices only). An instrument to monitor the effective value of heating current flow through the power conductors of the specimen within an accuracy of ±1 percent.

(f) *Temperature measuring device.* (For electric cables and splices only). An instrument to measure conductor temperature within an accuracy of ±2 percent without the necessity of removing material from the test specimen in order to measure the temperature.

§ 7.407 Test for flame resistance of electric cables and cable splices.

(a) *Test procedure.* (1) For electric cables, prepare 3 specimens of cable, each 3 feet in length, by removing 5 inches of jacket material and 2½ inches of conductor insulation from both ends of each test specimen. For splices, prepare a splice specimen in each of 3 sections of MSHA-approved flame-resistant cable. The cable shall be of the type that the splice kit is designed to repair. The finished splice shall not exceed 18 inches or be less than 6 inches in length for test purposes. The spliced cables shall be 3 feet in length with the midpoint of the splice located 14 inches from one end. Both ends of each of the spliced cables shall be prepared by removing 5 inches of jacket material and 2½ inches of conductor insulation. The type, amperage, voltage rating, and construction of the cable shall be compatible with the splice kit design. Each splice shall be made in accordance with the instructions provided with the splice kit.

(2) Prior to testing, condition each test specimen for a minimum of 24 hours at a temperature of 70 ±10 °F (21.1 ±5.5 °C) and a relative humidity of 55 ±10 percent. These environmental conditions shall be maintained during testing.

(3) For electric cables, locate the sensing element of the temperature measuring device 26 inches from one end of each test specimen. For splices, locate the sensing element 12 inches from the midpoint of the splice and 10 inches from the end of the cable. The sensing element must be secured so that it remains in direct contact with the metallic portion of the power conductor for the duration of the flame-resistant test. If a thermocouple-type temperature measuring instrument is used, connect the sensing element through the cable jacket and power conductor insulation. Other means for monitoring conductor temperature may be used, provided the temperature measurement is made at the same location. If the jacket and conductor insulation must be disturbed to insert the temperature measuring device, each must be restored as closely as possible to its original location and maintained there for the duration of the testing.

(4) Center the test specimen horizontally in the test chamber on the three rods. The three rods shall be positioned perpendicular to the longitudinal axis of the test specimen and at the same height, which permits the tip of the inner cone from the flame of the gas burner, when adjusted in accordance with the test procedure, to touch the jacket of the test specimen. The specimen shall be maintained at this level for the duration of the flame test. The two outermost rods shall be placed so that 1 inch of cable jacket extends beyond each rod. For electric cables, the third rod shall be placed 14 inches from the end of the test specimen nearer the temperature monitoring location on the specimen. For splices, the third rod shall be placed between the splice and the temperature monitoring